

Health and the Environment

Investing in our transportation system can help align citizens' goals for a healthy environment. Environmental elements (see Figure 63) are considered part of every project's design, construction, operation and maintenance.

Highway capacity and widening projects are designed to:

- » Manage stormwater by removing pollutants and controlling flow
- » Protect the quality of groundwater
- » Control erosion of streambanks and reduce surface run-off
- » Provide fish passage
- » Allow habitat connectivity for wildlife
- » Build barriers to reduce traffic noise on neighborhoods
- » Replace and improve wetland functions
- » Protect cultural and historic resources
- » Minimize air pollution
- » Provide bicycle/pedestrian facilities as needed.

WSDOT plans to continue investing in stand-alone environmental retrofit projects to fix problems along the existing highway system.

These retrofit projects include:

- » Remove culverts that keep fish from reaching upstream habitat
Provide habitat connectivity where there is a high incidence of vehicles striking wildlife
- » Reduce highway noise in areas not addressed by past construction projects
- » Manage stormwater on highways that do not treat runoff or control flow
- » Fix stretches of highways that suffer from repeated flooding or streambank erosion
- » Provide pedestrian crossings near schools, senior centers, and parks

Figure 63. Seven Core Elements to WSDOT's Environmental Management Systems

- » Legal and other requirements clearly outline all environmental laws, regulations, and agreements that apply to operations.
- » Written procedures instruct staff and contractors how to conduct work activities in compliance with requirements.
- » Training ensures those that conduct certain activities know how to do the work in a compliant manner.
- » Roles and duties ensure WSDOT staff and contractors know what they are to do under the EMS.
- » Inspection, monitoring, and corrective action ensure a process is in place to check WSDOT's work for compliance and correct any problems.
- » Documentation allows WSDOT to evaluate the operation of the EMS, and communicate results to the public and within the department.
- » Performance measurement compares WSDOT's performance against pre-determined targets, with results reviewed by management and reported to the public.

- » Provide bicycle connections near schools and in urban areas

Fish Passage Barrier Removal

Why is Fish Passage an Issue for WSDOT?

Salmon and other fish need access to freshwater habitat for spawning and juvenile rearing. WSDOT recognizes that many highway culverts are barriers to fish passage and removal of fish barriers is important to the restoration of fish habitats and salmon recovery efforts. Highway culverts can act as barriers to fish passage when:

- » The culvert outlet is too high and exceeds the jumping capabilities of fish

- » Water velocity through the culvert is too fast exceeding the swimming capabilities of fish
- » Water depth inside the culvert is too shallow — not enough water for the fish to swim through
- » Debris blocks access or creates turbulence that exceeds the swimming capabilities of fish

Fish Passage Barrier Needs

WSDOT's Fish Passage Barrier Removal Program began in 1991 to identify and remove barriers to fish passage. This is a cooperative effort with the Washington Department of Fish and Wildlife (WDFW). WSDOT contracted with the WDFW to inventory, identify, and prioritize state-owned culverts that are fish passage barriers. In September 2007, WDFW completed the state-wide inventory of WSDOT's highway system (approximately 7,000 miles). The data from the final inventory is still being tabulated. The WSDOT 2007 Fish Passage Inventory reported:

- » 6,210 culverts have been inventoried statewide
- » 3,142 culverts are in fish-bearing streams
- » 1,676 of the culverts in fish bearing streams were identified as barriers.
- » 1,266 WSDOT-owned fish passage barriers that are in need of modification or replacement were identified as having significant habitat gain. Significant habitat gain can be described as adding more than 200 meters of habitat by removing a barrier from a fish bearing stream.

Fish Barrier Removal Strategies

WSDOT evaluates and corrects fish passage barriers using a three-pronged approach. First, as road capacity and widening projects are constructed, fish passage barriers are removed whenever a Hydraulic Project Approval (HPA) is required for construction work on a culvert located within the project area on a fish bearing stream. Combining fish passage correction with road project construction decreases costs eliminating duplication in equipment and personnel mobilization. Second, fish passage barriers are removed using dedicated Environmental Retrofit budget category funding to correct the highest priority

fish passage barriers within the Fish Barrier Removal Plan. Third, in the Environmental Retrofit budget category, some fish passage barriers are corrected when WSDOT identifies and fixes failing culverts.

Since 1991, WSDOT completed 205 fish passage projects opening 480 lineal miles of habitat (see Photo 39).

Photo 39.



BEFORE

SR 20 near Mazama, Little Boulder Creek: A ten-foot culvert with a six foot drop created a fish passage barrier.



AFTER

A new 26-foot wide culvert replacement on Little Boulder Creek contains no drop and restores fish passage.

WSDOT spent \$46 million since 1991 for inventory and correction of fish barriers. \$20 million was spent on the fish passage inventory and \$26 million on correction. In 2006, 20 high priority fish passage projects were completed including seven stand-alone projects. More information on these projects can be found at: www.wsdot.wa.gov/Environment/Biology/FP/fishpassage.

Prioritization Approach for Strategies

WSDOT will continue to fix culvert barrier projects (see Photo 40) during highway widening and capacity improvement projects. Culvert barriers identified within the project limits are fixed whenever an HPA is required. If the highway project includes a fish barrier culvert within the project limits, but the culvert does not require an HPA, WSDOT is not required to fix the culvert, but may exercise discretion and fix the barrier on a case-by-case basis depending on the quality and quantity of the habitat gained and cost of the culvert replacement.

Photo 40.

Jimmycomelately Creek: A new bridge replaced a double box culvert.

WSDOT's current strategy for the fish barrier removal work in the Environmental Retrofit budget category is to continue to focus on fixing the highest priority fish passage barriers. Some barrier corrections provide more habitat gain than others and projects to correct the barrier can vary widely in cost. The highest priority barriers are those that open up the greatest amount of high-quality fish habitat at the lowest cost. The rate of barrier correction depends on the amount of funding the legislature approves for the WSDOT fish barrier removal program.

Each biennium dedicated funding within the WSDOT Environmental Retrofit budget category is set aside for correction of ranked, high priority fish passage barriers identified during the WDFW inventory. Projects are prioritized to provide the largest gains in habitat and the greatest production benefits for both migrating and resident fish species. Many factors determine a project's priority including: the degree of passage improvement, potential increase in production for specific species resulting from the gained habitat, amount of habitat gained, benefits or drawbacks from increased mobility to species present, stock status of species present, and cost of the project. All these factors are consolidated in a numeric priority index model, which provides an objective priority ranking for each project. These projects are contained within the WDFW Fish Passage and Diversion Screening Inventory Database.

How Does WSDOT Characterize the Benefits and Performance?

WSDOT characterizes benefits as the lineal miles of habitat opened up as a result of barrier removal. WDFW inspects each corrected barrier the first year after construction. Each project is checked for fish passage use, and certain sites are selected for long term studies to see if fish use continues and whether the design of the structure is working as intended.

Ten Year Planning Document

At WSDOT's request, WDFW has prepared a prioritized list of fish passage projects to be constructed and evaluated over the next ten years. The Ten Year Plan is the result of a process of project evaluation, scoping, development of conceptual designs, and budget development. The plan is regularly updated as projects are identified, prioritized, scoped, and refined. Project scoping is a multi-phased process that is carried out by WDFW biologists, environmental engineers, and WSDOT regional staff.

Habitat Connectivity

Why is Habit Connectivity an Issue for WSDOT?

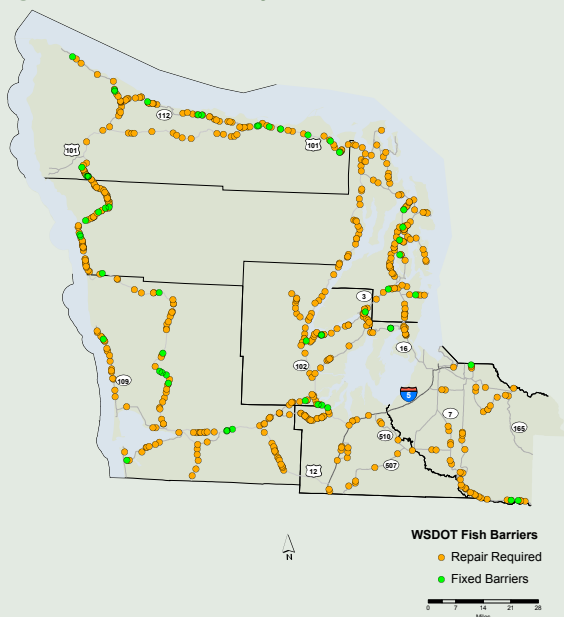
Washington is a biologically diverse state with over 650 vertebrate species. More than 63 of these are currently designated under the federal Endangered Species Act, including 38 terrestrial species. The state highway system is present in the majority of the habitat types of the state. There is strong public support for transportation solutions that include ecological considerations as part of meeting transportation objectives.

There is a growing understanding of the impacts of roads on wildlife and habitat. This is important from a natural resource conservation perspective as well as a matter of public safety. The 2005 publication by the National Academies of Sciences "Assessing and Managing the Ecological Impacts of Paved Roads" identifies how roads can constitute barriers to animal movement, lead to habitat loss, and in some cases can contribute to the decline of imperiled wildlife populations. Animal-vehicle collisions pose a serious hazard for motorists as well as a significant source of wildlife mortality. WSDOT annually records about 3,000 collisions with deer and elk on state highways (see Figure 64). A new WSDOT Secretary's Executive

Order “Protections and Connections for High Quality Natural Habitats (E 1031.00) discusses the importance of protecting high quality habitats and species and the need to develop and follow design criteria for transportation structures that help promote fish and wildlife movement and minimize habitat degradation.

Measures such as enlarged stream crossing structures, wildlife crossing structures (see Photo 41 and Figure 65), animal detection and warning systems, and fencing have proven useful in reducing some of the problems, but these need to be applied in a strategic manner to get the best gain. Significant effort has been made in a few areas of the state, such as the I-90 Hyak to Easton corridor, but in Washington, the attention has largely been opportunistic, and project by project. To provide the best benefit for habitat connectivity as well as helping reduce the potential for animal-vehicle collisions, a system for identifying and prioritizing key areas statewide is needed. This can then be used to develop location specific solutions in a strategic manner.

Figure 64. Fish Barrier Project Locations



Olympic Region Fish Passage Barrier Removal Projects
Illustrates a portion of the statewide data and maps
WSDOT has available for the identification of fish barrier
removal projects.

Photo 41. Rock Knob Wildlife Crossing



Before.



After.

Figure 65. Wildlife Crossings on Snoqualmie Pass

WSDOT is planning to build 14 wildlife crossings on I-90 using funds from the 2005 TPA Funding Package. These structures will be used to control wildlife crossings on a 15-mile stretch of road from Hyak to Easton. Wildlife overpasses and underpasses will be placed in areas that are heavily used wildlife crossing spots, connecting wildlife habitats on either side of the highway and in a large median area between the eastbound and westbound lanes. Ideas being considered for monitoring techniques include “track pits” (freshly-turned earth that is checked periodically for animal tracks) and hidden videocameras. WSDOT is currently examining structures in Arizona, Montana, and Canada to discover best practices in developing the structures and monitoring their usage. Construction could begin in 2011. For more information, visit www.wsdot.wa.gov/Projects/I90/HyaktoKeechelusDam/

How Can WSDOT Contribute to a Solution?

While there is a growing body of knowledge about how to better address wildlife habitat connectivity, research is needed to help identify high priority focus areas in the state. This research would be used for addressing wildlife connectivity statewide and to make preliminary recommendations for addressing connectivity. Working with existing GIS data, and other existing information including local expert knowledge, it would be possible to develop a habitat connectivity plan for the highway system. This would include locations of notable habitat areas for large terrestrial animals such as deer, elk and cougar, as well as for other species that are of special conservation management concern. This prioritization plan should also include locations where there are lands managed for habitat protection (i.e., parks, preserves, forest service land) and highway locations where significant animal-vehicle collisions occur.

Potential Benefits of Addressing This Issue

This research effort would provide a basis for determining the locations of key focus areas for animal connectivity. This could be used in project identification and scoping to identify where the best opportunities for improving connectivity and reducing animal-vehicle collisions are, and to allow these locations to be more easily included in long-term project planning. With a well developed system of habitat corridors, WSDOT will gain a better understanding of the scope and scale of the issue and can develop proactive strategies for improvements. This would also help with demonstrating compliance with federal regulations (SAFTEA LU section 6001) that directs states to incorporate natural resource information into transportation planning.

Habitat Connections

What is the Problem?

Transportation systems have the potential to impact habitat in ways that include:

- » Direct effects such as noise disturbance or wetland fill
- » Habitat fragmentation
- » Barrier effects that impede the movement of fish and wildlife.
- » Vehicle-wildlife collisions.

WSDOT recognizes the importance of habitat connections at the policy level.

Strategy to Address the Need

WSDOT is working on developing a habitat connectivity plan that will identify areas where habitat connectivity must be maintained. These will include priority areas where highways intersect important wildlife habitats, wildlife migration routes, and lands under special management for the protection and enhancement of wildlife (like wildlife refuges) and areas with high animal vehicle collisions. These areas will be prioritized as low, medium and high priority for retrofit. The prioritization process will consider many factors including, but not limited to, migration needs of ESA listed species, rate of animal-vehicle collisions, management of adjoining landscaped (i.e., wildlife refuges, national forest etc.), and highway areas that are wider than normal.

Performance

Effectiveness of the program will be measured by the methods that relate to the solutions implemented. Typical measures may include reductions in the numbers of animal-vehicle collisions, a measure of the number of connectivity structures installed per mile, frequency of use of connectivity structures, miles of habitat corridors connected etc.

What are the Benefits?

The benefits of this program are improved public safety by a reduction in animal vehicle collisions and improved animal connectivity between important habitat areas. Careful analysis will help WSDOT determine the highest priority locations where habitat connectivity investments should be made.

Fixing Chronic Environmental Deficiencies

What is a Chronic Environmental Deficiency and Why is This a Problem for WSDOT?

Chronic environmental deficiencies (CEDs) are locations along the state highway system where recent, frequent, and chronic maintenance and/or repairs to the state transportation infrastructure are causing impacts to fish and/or fish habitat. WSDOT established a collaborative process with the WDFW to move away from the repetitive repair of infrastructure and instead concentrate on long-term solutions

(see Figure 66) to optimize environmental improvements for fish and fish habitat while also addressing transportation infrastructure needs. A repetitive maintenance project becomes a CED when there are at least three or more repairs to the highway within a ten-year period that are causing impact to fish and/or fish habitat. WSDOT and WDFW coordinate on the identification, scoping, design, and construction of CED correction projects.

WSDOT uses funds from its Environmental Retrofit budget category to identify CED projects on state highways. WSDOT and WDFW coordinate on the identification, scoping, design, and construction of CED correction projects. WSDOT funds CED correction projects through a stand-alone retrofit program.

The 2005 Legislature provided \$52 million to fund 10 retrofit projects

How Do We Prioritize CED Projects?

The process for prioritizing CEDs (see Figure 67) is collaborative and includes technical (engineering and biological) construction/maintenance, and policy components. It is an integral part of a cycle that includes CED site identification, prioritization, scoping, design, funding, permitting, construction, and evaluation. Data for the prioritization are supplied in several steps of the CED project pre-scoping cycle.

Description of Benefits of Implementing the CED Program

The program reduces maintenance costs for chronic repairs, reduces flooding risk, and improves negative impacts to habitat for important fish species. Benefits can be measured by the reduction in maintenance work and the reduction in the size of the area impacted by the repetitive maintenance work (i.e. reduction of impacted area with removal of rip rap required for a repetitive river bank stabilization project).

Stormwater Management

WSDOT has come a long way toward aligning citizen's goals for a clean and healthy environment with meeting their transportation needs.

Figure 66. Project Costs

Over the last 20 years, WSDOT has spent approximately \$2.2 million for repair work at this site.

One alternative considered was to realign U.S. 101. Estimated project costs were \$10.0 million and did not include mitigation costs for major environmental impacts.

Total project costs were approximately \$7 million. Eighty seven percent of the project costs were paid by the Federal Highway Administration.



Before Construction - Flooding at the Hoh River erodes the shoulder of U.S. 101



July 2004 - Beginning of Construction



August 30, 2004 - Logjam construction progress



September 28, 2004 - Hoh River After Construction

Today's highway construction projects integrate environmental components into project design, budget, construction and operation. WSDOT is now making major investments in erosion and sediment control protection and stormwater management. This is in response to specific permit requirements as well as best practices that demonstrate our environmental commitment (see Table 13).

Public discussion of emerging issues, advances in scientific knowledge, and evolving practices also inform us of additional needs and priorities.

Figure 67. Chronic Environmental Project Locations

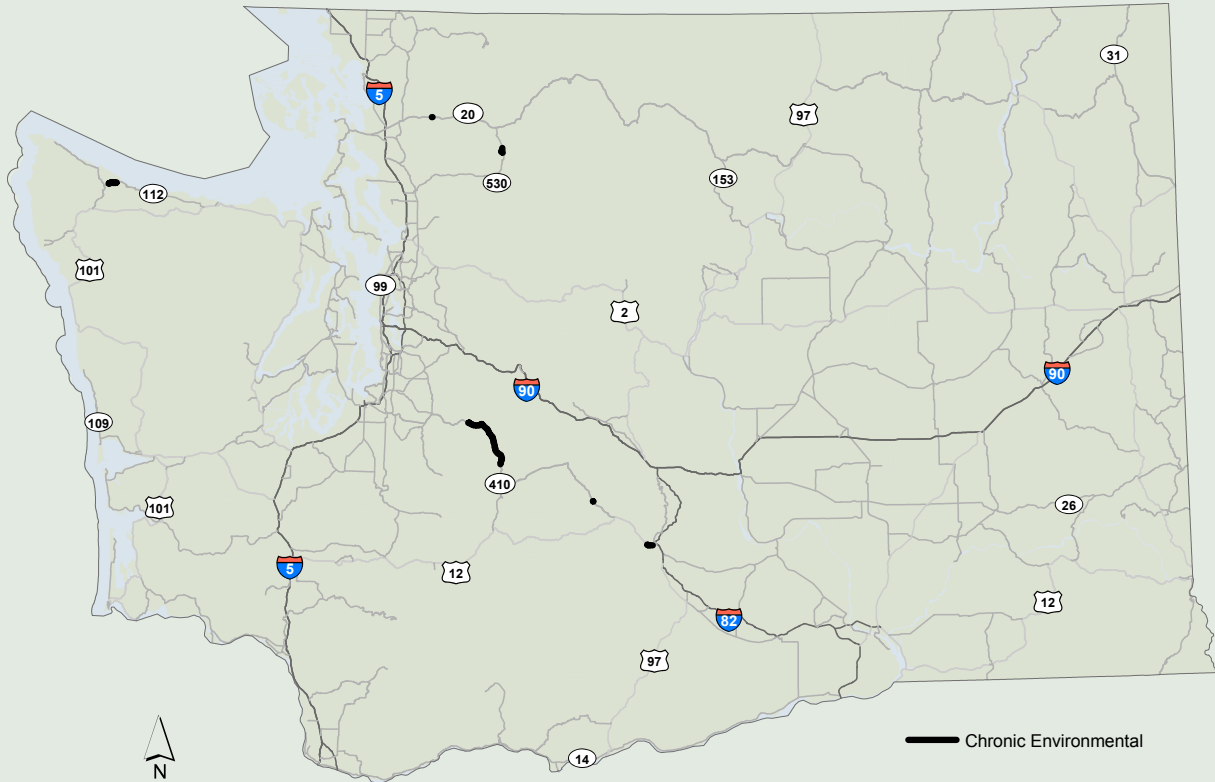


Table 13. Stormwater Treatment Facility Effectiveness

Pollutant (at monitored sites)	Before Treat- ment (lbs)	After Treat- ment (lbs)	Effective- ness vs. Goal set by DOE (% removal)	Average Pounds Captured (per Year per Acre)
Solids	78.9	6.4	92/80	520
Phosphorus	0.136	0.036	74/50	0.72
Total Zinc	0.158	0.040	74/N/A	0.85
Total Copper	0.0275	0.0094	66/N/A	0.13
Dissolved Copper	0.0074	0.0049	34/N/A	0.018
Dissolved Zinc	0.054	0.027	49/N/A	0.194

Source: WSDOT Environmental Services Office

WSDOT built 42 stormwater treatment facilities in Western Washington between July 2004 and June 2005. In response to municipal stormwater permit requirements, WSDOT has built 741 stormwater treatment facilities in King, Snohomish, Pierce, and Clark counties since 1996.

Improving our Performance: Stormwater Management

Today's focus is on managing stormwater runoff for flow control and pollutant treatment (see Photo 42), inventorying discharge outlets, and investigating the performance of stormwater best management practices in terms of their ability to remove pollutants from stormwater. WSDOT is continually learning more about the performance of various stormwater practices used by WSDOT and state, tribal, and local jurisdictions. Monitoring helps transportation agencies and regulators evaluate the effectiveness of treatment facilities and helps match the right treatment to each unique situation. WSDOT continually reviews performance monitoring data and routinely updates its policy manuals and technical guidance for use by the people who design stormwater facilities. As an example, WSDOT's research has shown that grass-lined swales can effectively reduce most pollutants from runoff and are very economical to build and maintain. WSDOT is now working with the State Department of Ecology and

Photo 42.



This pond near Tumwater (monitoring equipment in foreground) removes most solids and phosphorus from runoff.



The grassy swale near Canyon Park on I-405 was most effective at removing dissolved zinc and requires little space.



A dry pond along I-5 near Everett (it only fills during storms) was the most effective at removing copper.

other agencies on acceptable approaches to manage stormwater and flow control more broadly within a watershed.

Expanding the menu of available stormwater management techniques also helps to build connections between transportation investments and other community goals such as landscape design and watershed initiatives.

There are numerous strategies and policies that guide how stormwater is addressed on various projects. In most cases where new pavement or structures are constructed, all stormwater from the new surfaces is treated for quality and quantity. Solutions vary from simply utilizing existing vegetation, soils, and topography along roadsides to effectively provide flow control and runoff treatment through natural dispersion and infiltration to more highly engineered systems such as *linear sand filters* consisting of a two-chambered vault. *Linear sand filter* systems typically consist of two cells or chambers, one for settling the coarse sediment in the runoff entering the filter facility and the other for housing the sand filter media and underdrain outlet system. Treating stormwater outside the immediate project footprint is sometimes allowed.

WSDOT has established specific provisions for treating stormwater coming from existing pavement in order to maintain the financing intent and capacity of our budget category. In Mobility Projects treating runoff from existing pavement is always allowed. In Safety and Economic vitality projects there is generally a limit of 20 percent of the cost to treat new pavement, although a variance can be requested. Environmental Retrofit projects except for Stormwater Retrofit, are not allowed to treat runoff from any pavement. Paving projects can only consider retrofitting existing impervious surfaces involving the total replacement of existing concrete lanes.

These policies are reviewed periodically by the Strategic Planning and Programming Office to consider any changes that may be necessary due to changes in laws and other legislative directives.

Stormwater Retrofit Needs

Most highways were built prior to stormwater regulations and have no runoff treatment or flow control facilities associated with them. All new projects address stormwater, however, a small amount of funds are applied to retrofit old stormwater facilities where no new construction is planned. There is also a lack of information about the number and location of outfalls on the state system. Regulations requiring that highway runoff be treated to remove pollutants and control peak flows took effect for WSDOT in 1995. As most of Washington's highways predate such regulations, the water running off of these highways is not treated. This lack of treatment results in large amounts of dirty stormwater leaving the highway system in thousands of places called outfalls. The water from these outfalls potentially degrade receiving water bodies used for drinking, recreation, fish habitat, and other beneficial uses. Because new construction projects only affect limited portions of the highway system, WSDOT programming procedures allow for stand-alone environmental improvements as part of the Environmental Retrofit program. Although authorized, this program has received limited funding for some time despite a requirement of the Washington Administrative Code (Chapter 173-270 WAC) to retrofit deficient outfalls in the Puget Sound Region.

Strategy

While WSDOT is intent on addressing all stormwater deficiencies (see Figure 68), this stormwater strategy priority will be given to developing urban fringe areas. There is a closing window of opportunity associated with preserving and protecting urban fringe areas compared to rural and intensely urbanized areas. As the area develops, land becomes much more expensive. Decreasing land availability and increasing real estate costs in such areas impose a level of urgency to provide stormwater treatment before currently available, cost-effective treatment options are forever lost.

Development in urban fringe areas is transitioning to more intense land uses but the natural systems, while under stress, are still functioning properly and not beyond repair. Retrofitting stormwater here is more likely to make a measurable difference. At a minimum, the retrofits constructed in this environment will eliminate highways as a pollutant-contributing source as the area builds out. There

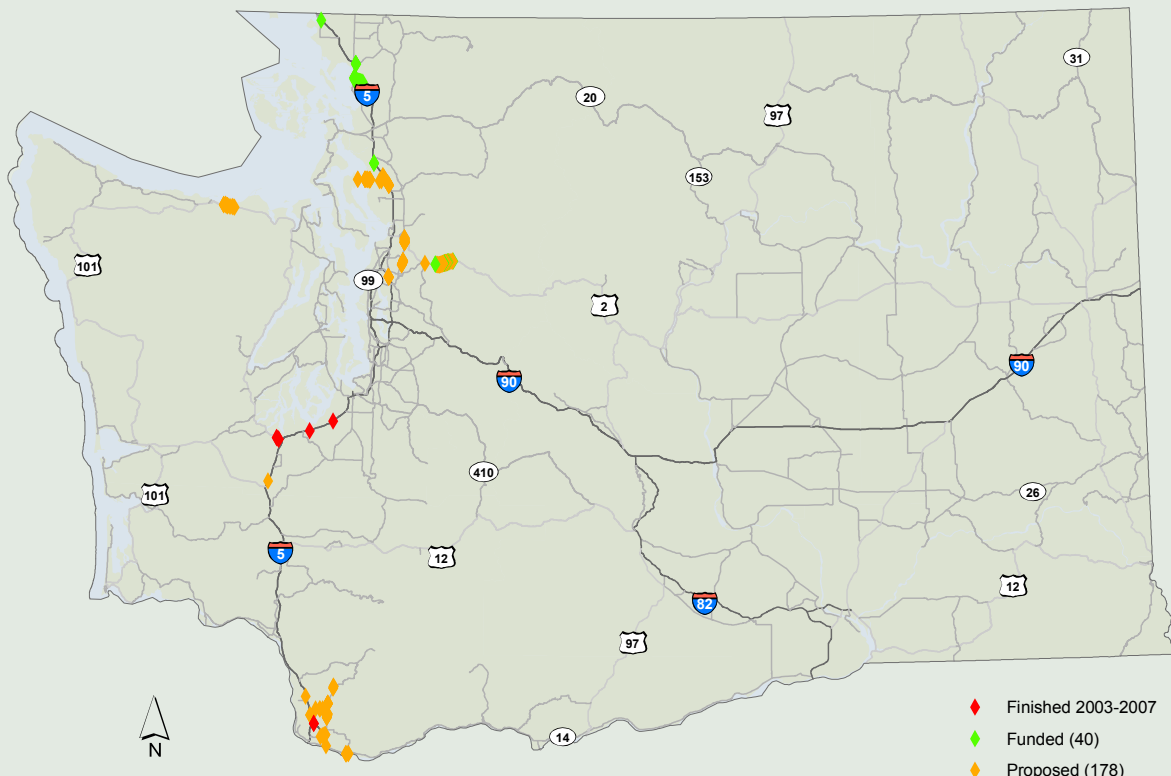
will be a large array of treatment facilities to choose from and more of an opportunity to use low impact development practices.

Retrofitting outfalls in rural area is less urgent because rural waters are less likely to become significantly affected in the near future and retrofit opportunities will not diminish as quickly. Likewise, potential benefits are low in urban areas where extensive development in surrounding areas severely limits the potential for significantly restoring habitat and water quality.

Prioritization

Within these developing areas environmental specialists will apply a rating methodology that takes into account proximity to sensitive surface water bodies, drinking water supplies, and traffic density. WSDOT will use the data to identify areas in the developing urban landscape where retrofits are most likely to have a beneficial impact. Additional detailed inventory can then be scheduled to determine the highest priority outfalls in those areas and the best solutions.

Figure 68. Stormwater Retrofits Projects



Performance

How Do We Characterize Benefit?

- » WSDOT can characterize benefit in terms of (1) acres of surface treated or (2) estimate reductions in annual pollutant load. The first can be accomplished in the design and, although the second can be estimated during design, it would be prudent to monitor a variety of treatment facilities constructed for retrofit purposes.
- » The level to which the retrofit supports other initiatives, for example protecting Puget Sound, Salmon recovery, etc., or any program that relies on water. Controlling water flow benefits fish habitat, reduces bridge scour, and culvert maintenance. Managing pollutants benefits the health of aquatic animals, drinking water supplies and human recreation activities.

2005 Legislative Action

The 2005 Legislature funded several stormwater retrofit projects (\$7.6 million for eight projects).

The proposal is to increase the funding for the stormwater retrofit program to complete the outfall inventory and fund more retrofit projects.

Description of Benefits/Impacts of Implementing the Proposal

Improving the performance of highway drainage facilities will improve water quality and reduce damage to the highway system and downstream areas from stormwater.

A complete inventory of outfalls and treatment facilities will help WSDOT better plan, execute and maintain an effective stormwater program.

The estimated cost to develop a strategic implementation plan, to complete the inventory of stormwater facilities on the state highway system, and begin retrofit installations at selected locations is \$340 million.

This dollar request is derived from the following: Stormwater retrofit (capital) and maintenance/operating unfunded priority needs including:

- » Funding projects on five percent of outfalls to install stormwater treatment statewide,

- » Completion of an inventory of stormwater facilities (to track and prioritize),
- » Stormwater facility maintenance and inspection to comply with new permits.

Related Investments Proposed by the Commission in the WTP

Roadside Maintenance – Retrofit of existing state highway shoulders and medians as part of the Integrated Vegetation Management program to improve filtration of stormwater runoff and establish desired grass stands.

Benefit of this change of practice would be decrease in herbicide use, weeds and invasive species and maintenance costs. Grass shoulders filter contaminants – benefiting water quality.

Noise Barrier Retrofit

What is the Noise Wall Retrofit Program?

Noise barrier retrofit is a voluntary program established by WSDOT to improve livability at locations where traffic noise exceeds certain levels and negatively impacts residential areas and other noise-sensitive areas; and that were not considered when highways and freeways were initially built. Retrofit locations are only identified if sensitive uses like homes, schools, and parks were permitted for construction on or before May 14, 1976. This date is important because federal traffic noise regulations came into effect in 1976. Highways built prior to that date are not subject to federal noise regulations unless they are widened or their alignments change.

A Short Summary of How, When and Why WSDOT Builds Noise Walls

Noise barriers (see Figure 69) are free-standing earth berms or walls built parallel to a highway. Walls are usually made of concrete and are found near public areas (such as parks) and residences. The barriers range in height from 6 to 30 feet, but are typically 12 to 15 feet tall. Around the Seattle area, examples of noise walls can be seen on Interstate 5 just north of the Ship Canal bridge, on Interstate 90 just west of the Mount Baker Ridge tunnel, and on Interstate 405 between Totem Lake and Bellevue. Most noise walls are installed as part of large construction projects that add new highway lanes, which increase vehicle capacity.

Long before construction begins, acoustical engineers evaluate sources and patterns of noise in neighborhoods near the project limits. The findings are used to determine if noise walls would be feasible and cost-effective. This evaluation takes into account many factors, only one of which is actual highway noise. Among other things, acoustical analysts look at area topography, population density, cost, and expected levels of noise reduction a barrier would provide. If, for example, homes near a project are widely-spaced or built high on a hill, WSDOT often will not build noise barriers because the cost to reduce noise for each resident is usually quite high and the barrier does not noticeably decrease noise.

WSDOT also builds noise walls in high-noise neighborhoods that existed before the freeway. These walls, known as “retrofit” walls, are submitted to the Legislature for programming consideration along with other important programs like safety improvements and pedestrian accommodations. To be equitable to everyone, retrofit noise walls are ranked and built according to a neighborhood priority list.

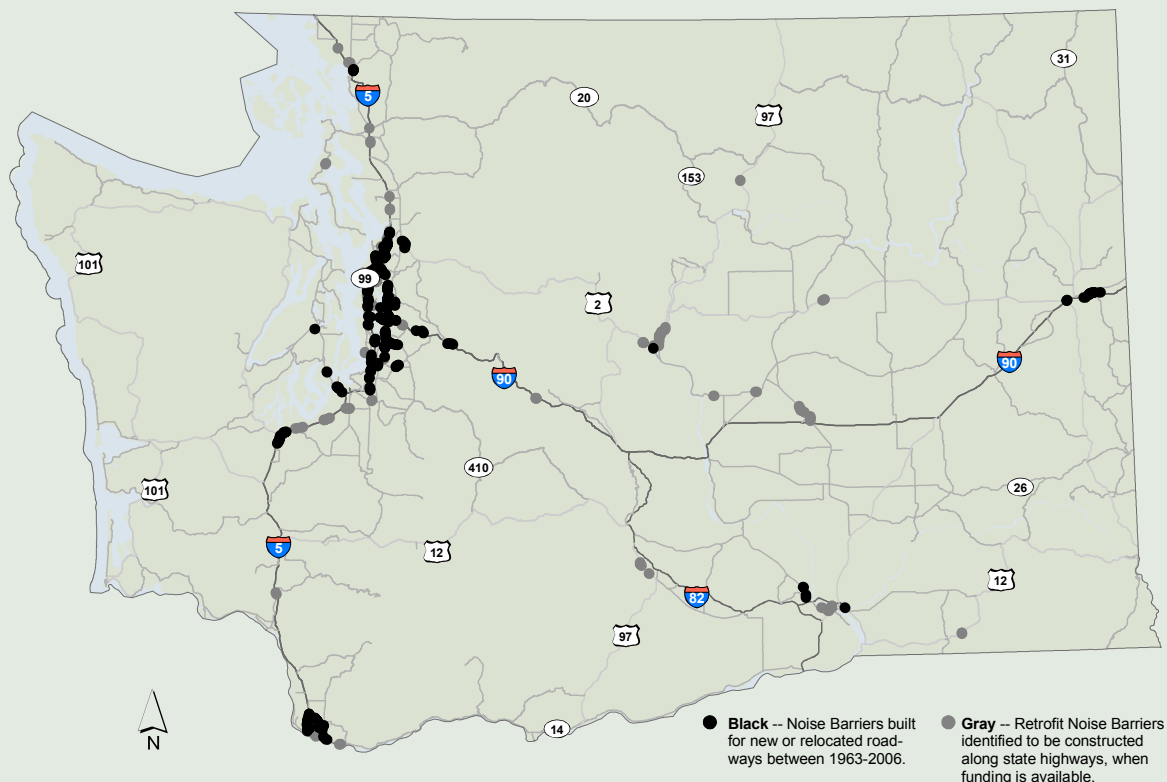
WSDOT builds on average one retrofit wall every two years. That means even if a neighborhood qualifies for a noise wall, it may be several years before it is actually built.

WSDOT receives many requests from citizens to build noise barriers, but not everyone wants them. Sometimes finished barriers obscure scenic views from residents’ homes. And, in almost every case, WSDOT must remove trees and shrubs within state right-of-way to make room for a barrier. Because of these differing viewpoints regarding noise barriers, WSDOT holds open houses during the design phase of a project to solicit public comments.

What is the Problem?

The impact of traffic noise on neighborhoods throughout the state was not considered before May 1976, when federal noise regulations were put in place. WSDOT has developed a prioritized retrofit program to construct noise barriers in these locations, but it has received limited funding.

Figure 69. Noise Barriers



Health

A threshold noise level at 67 decibels (dBA), for consideration of noise barriers, is based on annoyance curves from previous studies and has no actual relationship with health. Noise and health is an extremely complex relationship because it affects many people differently. Annoyance may lead to health concerns/stress like high blood pressure, anxiety, and difficulty concentrating or sleeping in some people but not in others. Some people have a high tolerance for loud noises and others are less comfortable with quiet. Some people will put up with traffic noise if there is a scenic view at stake – but not without one. Other people are upset because they cannot control their noise environment, yet that lack of control is not an issue.

Permanent hearing loss can occur when people are exposed to continuous high sound levels according to the US Occupational Safety and Health Administration (OSHA). The OSHA regulated levels range from 90 dBA for eight continuous hours to 115 dBA at ¼ hour or less. Typical continuous noise exposure for drivers and passengers inside standard cars may range from 65 to 85 dBA. Noise from traffic measured on the roadside ranges from 55 to 85 dBA based on a 15 minute time-weighted average.

Property Values

WSDOT provides noise mitigation when it is reasonable and feasible to do so (including a cost/benefit analysis). WSDOT's determinations are not related to property values in any way. If property values were taken into account, WSDOT would not be in compliance with environmental justice and non-discrimination values. The effects of noise mitigation on property values (like health), is so subjective that WSDOT can not make specific determinations. For example, if WSDOT places a noise wall that blocks a scenic view – property values may go up or down depending on the values of the property owner. For some locations, property values may temporarily dip during construction phases (because people do not generally like construction delays), but then come back up again once the project is complete. In some cases, properties values may increase more without a barrier because of better access to transportation facilities. When WSDOT places noise barriers, the property value

may go down because to some people the wall is too imposing, but others may value it more because of the noise reduction.

2005 Legislative Action

The legislature provided about \$38 million to address several of the highest priority locations.

Description of Proposal

WSDOT is looking to dedicate consistent funding for the noise retrofit program. The retrofit priority list currently consists of 61 locations in 20 different counties. This proposal will address the continued backlog of noise projects which will benefit established neighborhoods and help to meet noise reduction goals in an environment of increasing traffic volumes.

The WTP identifies funding of noise retrofits as a medium priority. Based on an updated cost assuming an inflation rate of approximately four percent, the anticipated total need is estimated at \$220 million in 2007 level dollars.

*No policy recommendations are made in the final WTP for addressing noise issues other than the specific retrofit of 60 locations.

Source WSDOT WTP Presentation-6/15/05

Noise Barrier Inventory

Source Prioritization Process

How are noise retrofit locations prioritized on the list and how will they perform?

Washington State Department of Transportation Directive D22-22 outlines the procedures for placing locations on the ranked retrofit list and provides a detailed methodology on how to prioritize locations. Locations on the list are prioritized in an order that reflects traffic noise levels, number of homes benefiting, planning level cost, and achievable reductions.

Each noise barrier project is designed to achieve noticeable reductions in traffic noise for benefiting residents. Typical reductions range from 3 to 15 dBA depending on the location of the listener in relation to the barrier. The department performs detailed noise studies prior to construction of a noise barrier to determine the amount of noise reductions that we anticipate a barrier to achieve.

Bicycle Transportation, Pedestrian Walkways and the Environment

Bicycling and walking are two modes that signify a dynamic transportation system. They provide not only environmental and health benefits, but also a strategy to reduce traffic congestion and have a positive economic impact across the state.

Description of the Issues

WSDOT is committed to working with private and local governmental entities to develop a plan which identifies bicycle and pedestrian needs and cost effective strategies. This plan will be consistent with the Legislature's stewardship goal and satisfy requirements of RCW 47.06.100 as well as the federal requirement for a long range bicycle transportation and pedestrian walkway plan.

The goal is to improve bicycle and pedestrian safety while increasing the number of people who bicycle and walk. The strategies for accomplishing these goals include: maximizing funding through partnerships; raising awareness of the needs for bicycle and pedestrian safety; and sharing information on bicycle and pedestrian issues between agencies, jurisdictions, and organizations in Washington State.

The rapid increase in obesity, diabetes, and asthma among children and adults in Washington State is a growing concern. Statistics from the Centers for Disease Control show that obesity trends among adults in Washington State have increased from less than 10 percent in 1991 to over 20 percent today. Personal transportation choices, the perceived limitations on personal mobility, and in some cases the lack of transportation alternatives have been implicated as contributing factors to these disturbing trends.

Needs

In response to these trends and research, several Washington communities have identified and benchmarked community health indicators that often include transportation measures such as the number of people walking and bicycling. Pedestrian and bicycling activity is a common measure of community health because this measure reflects many different aspects including safety, security, economic

vitality, public health, and the quality of the natural environment. Other indicators of healthy communities include:

- » available and affordable housing;
- » mixture of land use;
- » strong community leadership;
- » innovative neighborhood design;
- » interconnected pedestrian and bicycle facilities;
- » economic development initiatives;
- » creative stormwater management;
- » healthy wetland areas;
- » and improved air quality.

Strategies

Collaborative partnerships to develop and implement transportation systems are improving the way people live and work together by increasing access to transportation services and the way we share information about travel. A comprehensive approach to designing transportation systems considers the compatibility of each project with community character and values, the environment, and the unique needs and desires of the community.

The ability to plan, participate in planning efforts, or develop a community's transportation future depends on having trained planning staff. This is a key issue for many of Washington State's tribes, small cities, and counties that lack funding for such planning capacity.

Healthy Communities

WSDOT should coordinate with the Growth Management Services Division of the Department of Community, Trade and Economic Development. The two departments should convene a task force to identify sources and ways of pooling funds in order to support local governments seeking assistance in addressing the Growth Management Act requirement to include a pedestrian and bicycle component in comprehensive plans. Pedestrian and bicycle facilities and network constructed to provide for safe and healthy transportation options through walking and biking.

Washington Provides Grant Funding for Pedestrian and Bicycle Projects

The Washington State Legislature funded \$74 million over the next 16 years to support pedestrian and bicycle safety projects, such as pedestrian and bicycle paths, sidewalks, safe routes to school, and transit.

The Pedestrian & Bicycle Safety program will address the nearly 400 statewide fatalities and injury collisions involving pedestrians and bicyclists each year. The purpose of the Pedestrian and Bicycle Safety program is to aid public agencies in funding cost effective projects that improve pedestrian and bicycle safety through engineering, education, and enforcement. Eligible projects may address the following:

A. Engineering Improvements – Projects may include items such as:

- » Improving intersections by providing: curb extensions, lighting, raised median, crosswalk;
- » Enhancements, signs, signals, and mid-block crossing treatments;
- » Completing bicycle lanes and sidewalks;
- » Constructing bicycle and pedestrian paths;
- » Providing safe routes to transit;
- » Providing pedestrian and bicycle safety improvements for at-risk groups (children, the elderly, and people with disabilities).

B. Education Efforts – Projects may include items such as:

- » Implementation of educational curricula;
- » Distribution of educational materials;
- » Development of promotional programs for walking and biking.

C. Enforcement Efforts – Projects may include items such as:

- » Additional law enforcement or necessary equipment for enforcement activities;
- » Vehicle speed feedback signs;
- » Neighborhood watch programs;
- » Photo enforcement.

